

REMARKS

Claims 1-47 are pending in this Application, of which Claims 1 and 30 are the independent claims. All claims stand rejected.

Applicants note with appreciation the indication that Claims 13 and 39 would be allowable if rewritten in independent form. However, those claims have not so been rewritten because it is believed that the base claims from which they depend, as amended, are also allowable.

Claims 1, 2 and 30 are being amended to correct obvious drafting errors and to further clarify the scope of the claimed invention. Support for these amendments is found at least on page 50, line 26 – page 51, line 8; page 51, lines 19-28; page 52, lines 1-15; and Fig. 7 of the Specification as originally filed. Acceptance is respectfully requested.

Objections to the Specification

The Specification has been objected to as failing to provide proper antecedent basis for the claimed subject matter. Specifically, it is asserted that the Specification does not provide antecedent basis for the limitation “software operator” as recited in Claims 1 and 30. However, the Specification as originally filed describes exemplary embodiments of the invention including a plurality of “software operators”: “In particular, each Job 1-7 is formed of a respective sequence of operations using software operators SCAN, RESTRICT, PROJECT, SAVE AS, BROADCAST AS, JOIN WITH, GROUP BY, RETURN, etc. In a given sequence, each operator allows as input the stream of record data (or tuples) output from the immediately preceding operation and corresponding operator.” (see Specification at page 50, line 28 – page 51, line 3; page 10, line 25 – page 11, line 1). Thus, it is believed that the Specification provides antecedent basis for “software operator,” and reconsideration is requested.

The Abstract has been objected to for including the Title on the same page of the Application. The Abstract is being amended to correct this error.

Double Patenting

Claim 1 has been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent Application No. 10/668,113, and over claim 1 of U.S. Patent No. 10/667,128. A Terminal Disclaimer is being filed concurrently with this Amendment to disclaim any terminal part of a patent that may issue from the Application that extends beyond the expiration of U.S. Patent Applications No. 10/668,113 and 10/667,128. Accordingly, the double patenting rejection of Claim 1 is believed to be overcome.

Rejection of Claims 30-47 under 35 U.S.C. § 101

Claims 30-47 have been rejected under 35 U.S.C. § 101 for being directed to nonstatutory subject matter. Specifically, it is asserted that Claim 30 is directed to a method that “fails to produce a useful and tangible result.” Claims 30 and 47 have been amended to clarify the scope of the invention, and Claim 30 now recites “using a plurality of software operators, processing data according to a logical data flow.” Support for this amendment is found at least on page 50, line 26 – page 51, line 18 of the Specification as originally filed. By processing data at a plurality of software operators and transmitting record data, the claimed method provides processed data at nodes in the network, which is a useful and tangible result. As a result of this amendment, it is believed that the § 101 rejection of Claims 30-47 is overcome.

Rejection of Claims 1-12, 14-38 and 40-47 under 35 U.S.C. § 103(a)

Claims 1-12, 14-38 and 40-47 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kabra et al. (U.S. Patent No. 6,507,834) in view of Tao (U.S. Patent No. 7,191,169). Applicants disagree with this rejection and request reconsideration.

Amended Claim 1 is directed to an asymmetric data processor comprising one or more host computers, a plurality of Job Processing Units (JPUs), a network, and a plurality of software operators. To aid in understanding the present invention, Applicants refer to an exemplary embodiment represented in a flow diagram in Fig. 7 of their Specification. Here, a host computer 12 communicates with Job Processing Units (JPUs) 22a-c via a network 34, where each JPU 22a-c may access data at respective storage devices 23.

In an example operation, the host computer 12 receives requests from a requester 21, 36, 39 (e.g., a client computer or application) to process data stored at a plurality of storage devices 23 (e.g. hard disk drives). A plan generator (204 at Fig. 3) at the host computer 12 generates a plan for processing the request (Specification, page 48, lines 27-31). The plan comprises a number of jobs, which are distributed among the JPUs 22a-c and host computer 12 (Specification, page 50, line 28 - page 51, line 8). Each job further comprises a logical sequence of operations that are performed by software operators at the host computer 12 and JPUs 22a-c (“nodes”).

In performing these operations, each operator receives and transmits record data according to the logical data flow 700 defined by the plan (Specification, page 51, line 28 – page 52, line 18). The logical data flow can define processing within and across nodes 12, 22a-c, including processing from one JPU 22a to a successive JPU 22b. Thus, the operators process data based on readiness of a record and independent of transmission at other operators, forming a stream of record processing within and across the nodes 12, 22a-c (Specification, page 52, lines 11-18). Once completed, results of the record processing may then be transmitted to the requester 21, 36, 39.

Kabra discloses a method for parallel execution of queries at multiple data servers (Kabra, Abstract). As shown in Fig. 1, a query coordinator (QC) 104 receives a query from a client process 102 (col. 7, lines 27-37). The QC 104 generates an execution plan for the query and transmits portions of the plan to several data servers 130A-E. The QC 104 controls the parallel execution of the plan on the data servers 130. Fig. 6A illustrates this process, where the data servers 130A-B each receive a portion of the execution plan (610A-B), and then execute that portion of the plan (612A-B) (col. 11, lines 29-38). The data servers 130A-B transmit results of the execution to the QC 104, which compiles the results and transmits the compiled results to the client 102.

Kabra does not disclose a data processor arranged as recited in Claim 1. As stated above, Kabra describes a method of coordinating parallel execution of a query on multiple data servers. In contrast to the JPU of the present invention, however, the data servers 130 of Kabra are not “responsive to requests from host computers and from other JPUs to process data” (emphasis added). As shown in Fig. 6A, each data server 130A-B executes a respective portion of the plan

without communicating with one another. Although the Office Action cites Kabra at col. 7, lines 19-26, this passage merely describes transport protocol “between the QC 104 and any one of the DS 130 elements,” and does not describe communication between data servers 130.

On the contrary, Kabra teaches away from such communication: “...it is difficult to obtain and execute queries from within...one data server 130 when the data that is the subject of the [query] may reside on different data servers” (col. 12, line 65 – col. 13, line 3). Kabra teaches “preprocessing” at the QC 104 to avoid a need to access data on one data server from another data server 130 (col. 13, lines 14-24). In contrast, embodiments of the present invention do not encounter such a problem because each JPU is “responsive to requests from...other JPUs to process data.” Thus, Kabra actually teaches away from the present invention.

Tao discloses methods of selecting materialized views, and does not concern data processing at a plurality of nodes via a network. Given the aforementioned shortcomings of Kabra, no combination of Kabra and Tao teaches or suggests the present invention.

Amended Claim 30 is directed to a method of data processing, and is allowable at least for the reasons stated above. In particular, no combination of Kabra and Tao teaches or suggest providing a plurality of JPUs or using a plurality of software operators as recited in amended Claim 30.

Claims 2-12, 14-29, 31-38 and 40-47 each depend from either Claim 1 or Claim 30 and thus are allowable at least for the reasons stated above. As a result, the § 103 rejection of Claims 1-12, 14-38 and 40-47 is believed to be overcome, and reconsideration is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By 

David J. Thibodeau, Jr.

Registration No. 31,671

Telephone: (978) 341-0036

Facsimile: (978) 341-0136

Concord, MA 01742-9133

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